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Body Temperatures of the Tuatara under Natural Conditions

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Several studies concerned with thermoregulation in amphibians and reptiles have been carried out in recent years (references cited by Bogert 1949, 1952), but there has been no detailed account of the thermal requirements of the supposedly primitive tuatara, the rhynchocephalian relict, *Sphaenodon punctatum,* that inhabits islets off the coast of New Zealand. However, when Dr. Karl P. Schmidt and Dr. Robert Cushman Murphy were in New Zealand in 1949, they generously made arrangements with Mr. William H. Dawbin of Victoria University College to have him assemble the required information. To secure body temperatures of tuataras while they were abroad and active at night, Mr. Dawbin made two trips. On April 23-25 he obtained the temperatures of 45 individuals on Stephen Island. Owing to the fact that tuataras were not abroad during the winter months, he did not return until the following spring (November), after he had been informed by the lighthouse keepers that the reptiles had re-emerged. On his second trip the nights of November 4 to 6 were spent on Stephen Island, where the temperatures of 26 additional specimens were recorded. The purpose of this note is to report Mr. Dawbin's findings.

All temperatures, including those of the air, the substratum, and of the reptile, were obtained with the special thermometer described by Bogert (1949). To avoid recaptures each tuatara was marked with a toe-clip prior to release. Care was taken to prevent the transfer of heat from the hands, and the record for one tuatara held two minutes before a thermometer could be inserted in its cloaca is omitted from tabulations since the temperature was 0.8° C higher than that for any other taken in April. The specimens captured varied from 95 to 277 mm in snout-vent length, but there is no evidence of any correlation of size with body temperatures. All readings were obtained for tuataras active between the hours of 8:30 p.m. and 1:00 a.m., most of them between ten and midnight. During the nights when the temperatures were recorded the weather varied from calm and clear to overcast, with a "cold gusty wind" on one night in April, and with strong or moderate winds in November, when three nights were respectively clear, foggy or with rain. The results of Mr. Dawbin's records are presented in the following table:

Table I. Thermal Data for Sphaenodon

BODY TEMPERATURES °C

Time	No. of obs.	Mean ±σM	Range	Coef. Var.
Apr.	45	11.0±.23	6.2-12.2	13.9
Nov.	27	10.6±.34	7.6-13.3	16.9
Apr. + Nov.	72	10.9±.19	6.2-13.3	15.1

AIR TEMPERATURES °C

Time	No. of obs.	Mean ±σM	Range	Coef. Var.
Apr.	45	12.2±.13	9.4-14.0	7.2
Nov.	17	11.4±.35	8.8-13.7	12.9
Apr. + Nov.	62	12.0±.14	8.8-14.0	9.3

There is no significant difference between the means for body temperatures in April (11.0° C) and November (10.6° C). It is noteworthy that tuataras tend to be somewhat cooler than their surroundings. The difference of only 0.8° C between means for the air temperatures obtained during the two seasons is statistically but probably not ecologically significant. Temperatures of tuataras recorded on nights when the weather was windy tend to be more uniform than those obtained when it was clear and calm. Two of the three tuataras (not included in tabulations) taken during daylight hours on the afternoon of April 23 had higher temperatures, 14.0 and

18.0° C, respectively, than any taken at night, probably because they had been basking prior to capture. A few substratum temperatures recorded at night in November tend to be only a fraction of a degree higher than those of the air, recorded at approximately the same time, 5 cm above the spot where each tuatara was captured.

The temperatures obtained by Mr. Dawbin are somewhat lower than those reported for terrestrial salamanders abroad and active during the summer in the higher mountains of Virginia (Bogert, 1952). More significantly perhaps, the tuatara proves to be active at a far lower mean body temperature than any other reptile thus far studied. Possible implications of such thermal requirements are discussed elsewhere (Bogert, 1953).

References Cited

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